



## Drought Considerations for Soybean

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- As of July 1, 28% of Indiana's soybeans have entered the bloom period.
- As of July 1, 20% of the soybean were rated good to excellent
- As of July 1, approximately 90% of the crop is short to very short in soil moisture.
- Soybean grows vegetatively early in the growing season where vertical and horizontal growth occurs. This period is establishing the foundation to capture sunlight and the factory to produce high volumes of converted energy (sunlight to essentially plant sugars).
- Early onset of drought affected soybean in: stand establishment and vegetative growth.
  - **Stand establishment** is the measure of how successful the sown seeds develop into plants. Variable soil moisture at planting and shortly thereafter caused variable soybean emergence. Some of the yield loss due to the dry conditions is simply due to fewer plants to build the foundation and the factory to harvest sunlight. Yield loss in those fields will vary depending on the resulting rain patterns.
  - **Early vegetative growth** has been limited in many fields. Fields planted into adequate soil moisture established a good stand of plants. These fields were able to grow and develop a good root system (taproot) that has been accessing subsoil moisture. The well-developed root system allowed these fields to hang on during the early drought. Soybean in these situations typically placed more energy and effort into developing the roots instead of the leaves and stems. The result is stagnant aboveground growth (smaller leaves and less vertical growth), which could reduce yield by limiting the factory needed to harvest sunlight. As the drought prolongs, flowering will initiate on smaller plants and yield potential will be reduced due to limited mainstem development (nodes).
- However, soybean can make up a lot of ground when rain returns. The majority of the state will be entering into the bloom period in the coming week. Soybean blooms over 3 to 4 weeks and can bloom over a shorter or longer period based on the growing conditions. The relative long bloom period (in comparison to corn) allows soybeans to be more adaptable to adverse growing conditions. In other words, soybeans can tend to withstand a longer period of drought and still yield reasonably well (provided moisture returns).
- Soybean will typically lose up to 75% of the flowers in a normal year. Soybean will not keep every flower that develops. This is a natural process that allows the plant to "pick and choose" the flowers that will develop into pods. Developing pods are subject to stresses and pod abortion can occur from excessive heat, limited moisture, and other factors.
- If rain returns, flower and pod retention will increase and vegetative growth (leaves and stems) will resume. The shortfall in yield will be due to limited leaf area and mainstem leaves (i.e., nodes). The last component that can assist in gaining yield in soybean is seed fill. Soybean will respond to growing conditions during pod development and seed fill. If drought conditions continue through July and August, pod retention will decrease and seed fill will be limited. However, even under limited pod retention soybean can gain yield in seed size as was likely seen in 1991.
- In previous drought years, departure from yield trend was:
  - - 28% in 1988,
  - ONLY -1.7% in 1991
- Soybean has a great ability to adapt to extreme growing conditions due to its taproot, resource allocation, and multiple yield-forming factors (e.g., node development, long bloom period, and seed fill window).